



The Unearthing of NO₂

Dominican College Sion Hill

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Introduction

As part of the GLOBE environmental program in our school a number of 1st year Science students volunteered to assess Nitrogen dioxide levels in our campus. We were examining the presence of NO₂ around our school premises using diffusion tubes. Blackrock is a suburban with a pleasant green environment.

The tubes were stationed in three locations; Adjacent to our school entrance facing a busy road. Alongside our school pond.

And close to our tennis courts and sports pitch. Electricity generation and road traffic are the two main sources of nitrogen dioxide. In most urban areas road traffic is by far the major source. Its presence in air leads to the formation and modification of other air pollutants. N-O Nitrogen monoxide reacts with oxygen in the air to produce nitrogen dioxide O-N-O. Nitrogen dioxide also contributes to the formation of acid rain which damages vegetation, buildings and water bodies. If regular monitoring is carried out and reported back to the local council or committee, immediate measures can be taken to improve air quality.

Research Question(s)

Where is the largest NO₂ hotspot in the world ? According to EcoWatch Greenpeace has revealed the world's largest NO₂ hotspots across six continents, and identified Mpumalanga, South Africa as the biggest NO₂ hotspot, even outranking areas in China, India and the U.S.

How does nitrogen dioxide affect human health? Scientific evidence links short-term NO₂ exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects including airway inflammation in healthy people and respiratory symptoms in people with asthma.

Studies also show a connection between short-term exposure and increased emergency room visits hospital admissions for respiratory illnesses.

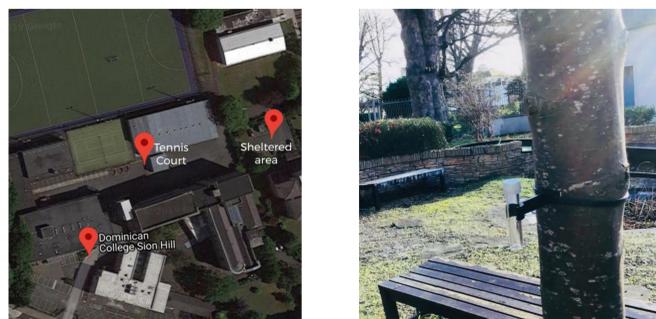
What is NO₂ and in what way is it harmful to the environment?

NO₂ is also known as Nitrogen dioxide and is part of a group of gaseous air pollutants produced as a result of road traffic and other fossil fuel combustion processes.

NO₂ does not affect the environment if it is in small amounts but it can be fatal in large amounts.

Research Methods

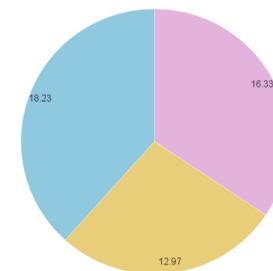
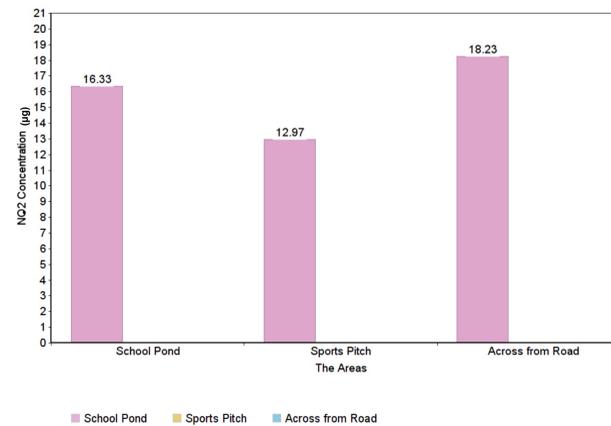
Our process was simple. We positioned the tubes in the 3 locations on the 31st of January. We later detached the tubes three weeks later, but. Our results could have been very different if we conducted this experiment at a different time of year, as the NO₂ levels in the winter may rise because of the increase of car usage. Warm weather could also impact our results, as sunlight triggers a secondary pollutant and make the gases more fatal and dangerous. Wind can also bring pollution from other areas.



Results

Our results were as follows :

- Adjacent to our school facing a busy road the volume of NO₂ present in the atmosphere was 18.23 µg/m³.
- Alongside our school pond the volume of NO₂ present in the atmosphere was 16.33 µg/m³.
- At close quarters to our tennis courts the volume of NO₂ present in the atmosphere was 12.97 µg/m³.



NO ₂ concentration (µg/m ³)	Description
50 +	Extremely bad
45 - 50	Very bad
40 - 45	Bad
35 - 40	Substandard
30 - 35	Mediocre
25 - 30	Average
20 - 25	Pretty good
15 - 20	Good
10 - 15	Very good
0 - 10	Excellent

Discussion

We are thrilled with the clean air quality displayed in our school, but we feel that we should continue to strive to do better and retake the test in a few months from now or at a different time of year. Our school is filled with thriving vegetation, and very little movement from cars, besides those of the teachers. We have actually enforced the rule in our school, which is that parents of our students are not allowed to drive their car into the school's grounds. For that reason, we did not expect our results to be bad, so were not too surprised with our amazing results. Although our results were above average we are always trying to improve our school's ecosystem and help it become more environmentally friendly. We have the travel flag which promotes the use of public transport, carpooling, walking & cycling to school. We also host annual COW/WOW days encourage both staff & students to walk or cycle on Wednesdays.

Conclusions

There is a definite correlation between low traffic flow on our school grounds and clean air quality as display in our results. As a community we want to improve the air quality we need to make considerable efforts to promote greener transport to schools. Governments need to improve cycling lanes and reduce the cost of public transport. Schools need to provide bike racks for students or staff who wish to cycle. We know nature cannot take action for what we humans are causing. We as a society need to take action. What we did is not changeable and a single person or a small group of students like cannot make to much of an impact on our environment. We need everyone to take part in helping the future and the future of this earth. The past is now in the past and now we have to focus on the future. OUR FUTURE. Staring small is great. IT'S TIME TO MAKE A CHANGE.

Bibliography

- ecowatch.com
- greenpeace.org
- <https://www.airnow.gov/index.cfm?action=pubs.aqguidenox>



Air Quality Campaign Ireland 2019

